

## Design and Configuration of a 5 hp Microprocessor Controller Inverter

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The purpose of this project is to design a 5hp variable electric drive that converts an AC input signal to DC then to a variable AC output signal voltage that would vary the speed of an AC induction motor. To achieve the goals of this project, two three phase rectifiers are used to convert the AC input voltage to a DC voltage which in turn is inverted and its output amplitude and frequency varied using a pulse width modulation microcontroller. The inverter consists of six Insulated Gate Bipolar Transistors with gate drivers and a digital signal processor to generate the switching signals. The variation in AC output voltage allows the speed of the AC induction motor to be varied from zero to 1700 rpm. Although the load in this application is a 2 hp induction motor, the power system has been designed for a 5 hp unit. The main advantage of this system is its affordability and energy-efficiency. The cost of all components except that the motor has been estimated to be less than \$500, while similar products in the market cost at least ten times more. Low cost and energy efficient variable speed drives have numerous applications including appliances (fans, vacuums, etc.), industrial drives (robotics, centrifugal pumps, etc.) and automotive control (hybrid electric vehicles, electric trains, etc.)

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